IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

DAVID L. LARKIN ET AL.

Serial No. 09/988,651 (TI-23422.1)

Filed November 20, 2001

For: A METHOD FOR DECREASING CHC DEGRADATION

Art Unit 2891

Examiner Igwe U. Anya

Customer No. 23494

CERTIFICATE OF MAILING OR TRANSMISSION UNDER 37 CFR 1.8

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9-4-09

Jay M. Cantor, Reg. No. 19,906

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

REQUEST FOR REHEARING UNDER 37 C.F.R. 41.52

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With reference to the alleged "undisputed" item listed on page 8 and 9 of the Decision, it is stated at 1. that "[t]he claims do not recite the use of hydrogen for the purpose of decreasing CHC degradation". While this statement is correct, the fact remains that the entire specification relates to decreasing CHC degradation, the SUMMARY OF CLAIMED SUBJECT MATTER on page 2 of the Brief on Appeal states that the invention relates to "decreasing channel hot carrier (CHC) degradation. In any litigation, the claims herein would be limited to decreasing of CHC degradation by file wrapper estoppel and could not be advanced against some unrelated allegation of infringement. Accordingly, it is basic patent law that the concept of decrease of CHC degradation is included in the claims by file wrapper estoppel.

With reference to the allegation at 2. that "[t]he claims are drafted in product-by-process format and, therefore, do not limit the final, claimed semiconductor device to one which is substantially saturated", this allegation is without merit. All of the independent claims specifically state that "hydrogen diffuses throughout and substantially saturates the semiconductor device" (claims 12 and 21). This means that all or all but an insignificant number of bond sites contain a hydrogen atom. The Board has agreed to this interpretation by reversing the rejections by the Examiner under 35 U.S.C. 112, first and second paragraphs. In a product-by-process claim, it is essential that the product be patentably novel as stated at page 9 of the Decision with reference to *In re Thorpe,* 777 F.2d 695, 697 (Fed. Cir. 1985) and this is the case herein. The disclosure clearly states that the semiconductor device is "saturated" (see page 7, lines23ff of the disclosure). Nothing of record other than the unsupported statement of the Examiner provides even an iota of evidence that the saturated device loses saturation. Furthermore, even assuming, arguendo, that saturation were to be lost over time, this does not mean that the device does not operate in the manner intended (decrease of CHC degradation) for some period of time. That is all that is required to have an

operative embodiment. It is basic knowledge that essentially all chemical materials degrade over time, be it fractions of a second, hours, days or millenia. For example, a soft drink containing CO_2 loses that gas over time. However, the liquid containing the gas is considered to be carbonic acid for the period in which the CO_2 is present and is so used.

With reference to 3. that "[o]ne of ordinary skill in the art would be aware that hydrogen diffuses out of silicon over time, so the level of hydrogen in the semiconductor's *final* structure will be lower than the hydrogen level immediately following the hydrogenation treatment", the argument against the position taken by the Examiner and expressed in the Decision is set forth in the above paragraph. The device is saturated as claimed and CHC degradation is decreased as stated under oath in the specification as filed. Furthermore, even assuming, arguendo, that hydrogen diffuses out (which has not been shown of record), this out diffusion, even if it be present, would be miniscule over a given period of time and still provide the substantial saturation as claimed.

With reference to 4. that "Ino, Mora and Chen disclose semiconductor devices containing diffused hydrogen", while the cited references may contain diffused hydrogen, that is not the totality of what is claimed and that is not what, in itself, will result in a decrease of CHC degradation. In order for CHC degradation to be decreased, it is necessary that the device be *saturated* with hydrogen. Mere diffusion of hydrogen without saturation will not provide the decrease in CHC degradation. Clearly, all of the cited references not only fail to discuss the problem involved, but they also fail to mention in any way saturation with hydrogen. There is no reason to assume that saturation takes place in any of the cited references. Any allegation to this effect is obtained only from a prior reading of the subject disclosure and is certainly not found in any of the cited references. It follows that neither the problem nor its solution are recognized by any of the cited references. As stated in the paragraph on page 7, line 21ff, hydrogen treatment involves placing the

semiconductor device in a hydrogen rich environment and heating in that environment *until hydrogen has saturated completely within the semiconductor device*. Mora not only has nothing to do with the problem, but Mora also does not use a hydrogen rich environment. Note in col. 2, line 11ff that Mora uses 95% nitrogen and 5% hydrogen. This is not a hydrogen rich environment. Furthermore, nothing in Mora indicates hydrogen saturation and there would be no reason to expect hydrogen saturation with a 95% nitrogen environment. Ino also has nothing whatsoever to do with decrease of CHC degradation. With respect to the introduction of hydrogen, this is mentioned at col. 10, line 16ff where it is stated "[t]hereafter, hydrogen is introduced into the silicon film 42 through the first layer insulating film 48 and the second layer insulating film 50 using the P-SiN film 51 as a cap film". The use of hydrogen in conjunction with SiH_4 is discussed at col.15, line 30ff, however this is used to provide an amorphous silicon film and has nothing to do with decrease of CHC degradation nor mentions saturation with hydrogen, especially when no hydrogen rich environment is present. With reference to Chen, again, there is no mention of the problem or solution relating to the decrease of CHC degradation in a semiconductor device. The hydrogen-containing plasma is used to restore dangling Si-H bonds in HSQ, an insulator (col. 2, lines 51ffof Chen) and not a semiconductor device. Furthermore, Chen utilizes a hydrogen/nitrogen plasma to restore Si-H bonds in the HSQ to up to about 90% (see col. 5, line15ff). It follows that Chen fails to show (a) the use of a hydrogen rich environment, (b) the application of hydrogen to a semiconductor material, (c) the saturation of the insulating material (which material is not analogous to semiconductor material) and (d) recognition and decrease of the problem of CHC degradation.

With reference to the paragraph of the Decision bridging pages 9 and 10, it is respectfully submitted that there is a host of material refuting the allegation set forth therein hereinabove as well as in the papers previously filed. While one or more of the cited references may include the use of

diffused hydrogen, such use in itself is not the issue. The issue is whether the semiconductor device is substantially saturated with hydrogen. As demonstrated above as well as in prior papers as filed, none of the cited references recognize the problem involved, none of the references discuss a solution to the problem involved and none of the references discuss the use of a hydrogen treatment "until hydrogen diffuses throughout and substantially saturates the semiconductor device as recited in claims 12 and 21.

For the reasons stated above and in the Brief on Appeal and Reply Brief, rehearing and reconsideration of the Decision and reversal of the final rejection and allowance of the claims on appeal is requested that justice be done in the premises.

Respectfully submitted,

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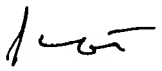

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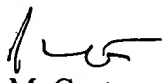

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